REMARKS

Responsive to the outstanding Office Action, applicant has carefully studied the Examiner's comments. It is respectfully submitted that no new matter has been presented in this amenment. Favorable reconsideration of the application is respectfully requested.

The claims pending in the application are claims 23-44. In the amendment, applicant has amended claims 23, 26, 28, 31, 35, 36 and 39. Two sheets of amended drawings have been presented, and certain paragraphs of the specification have also been amended.

The Examiner made several objections to the drawings for not including reference numerals mentioned in the description. In response thereto, two sheets of proposed amended drawings are submitted herewith, with changes indicated in red. Additionally, several paragraphs of the specification have been amended to remove non-essential reference numerals. It is believed that the drawings now comply with the requirements of 37 CFR 1.84(p)(5).

Additionally, the Examiner rejected claims 23-44 under 35 USC §112, second paragraph. The Examiner made specific rejections against claims 23, 24, 26, 27, 28, 31, 35, 36 and 39. In response thereto, these claims have been amended to correct the deficiencies noted by the Examiner. Specifically, claim 23 has been amended in a manner believe to comply with 35 USC §112. In claim 26, the expression "in each case" has been deleted. Due to the amendments to claim 23, it is submitted that "the optical conductors" in claims 24, 27 and 39 have proper antecedent basis. With regard to the Examiner's question regarding "outer ends" and "end faces", the term outer end can include the end faces, but is not necessarily limited to just this structure. Claims 28, 31, 35 and 36 have been amended in a manner believed to comply with the requirements of 35 USC §112. Claim 37 refers to "one of the at least one layers". It is submitted that this has proper antecedent basis in claim 23 which states "has at least one layer which is applied to a support and which at least one layer contains a fluorescing material." This claim has been amended to remove "fluorescence-exciting light."

It is thus believed that all of the claims fully comply with the requirements of 35 USC §112, second paragraph.

The Examiner rejected claims 23-28, 31-37, 39, 40 and 43 under 35 USC §103 as being unpatentable over Saaski et al. (U.S. Patent No. 5,606,170.) Claim 29 was rejected under 35 USC §103 as being unpatentable over Saaski in view of Pederson et al. Claim 41 was rejected under 35 USC §103 as being unpatentable over Saaski in view of Hesse. Claims 30, 38, 42 and 44 were rejected under 35 USC §103 as being unpatentable over Saaski in view of Wagner and Bessman et al.

Before discussing the prior art in detail, the Examiner's attention is directed to the present invention, as claimed in amended independent claim 23. In the last amendment, claim 23 was amended to remove the "or" from line 8. This is significant in that the arrangement of the end faces of the optical conductors for exciting light and fluorescent light, with respect to their numerical apertures, and the position/distance (function) of the fluorescing layer is essential for achieving localized measurable fluorescence intensity. Therefore, in claim 23 as amended, the exciting light is directed directly into or in the direction of a fluorescing layer.

Saaski et al. discloses a sensor system which is, general, an evanescent wave-excited, fluorescent light generating type sensor. The exciting light is directed into and through an optical conductor (76, 144, 206 in Saaski). An evanescent field is generated outside of the optical conductor as a result of reflections of the exciting light along the inner surface of the optical conductor. Fluorescence may be achieved at every point of the outer surface of the optical conductor, if a fluorescing material inside a generated evanescent field is placed there with sufficient energy. In the case of total internal reflection a maximum of evanescent energy can be achieved. Therefore, in Saaski, the energy level at different areas or points of the evanescent field is not equal. It is only possible to detect defined localized distributions of fluorescent intensity by using differing fluorospheres which are located separately.

Pederson et al. discloses a fiber optic moisture sensor, comprising a housing and a support within the housing, with a film coating the support. First and second light guides are positioned to communicate illumination to and from the film. A reflective surface, within the housing, faces the film. The film includes an optically transparent polymer and a salt complex of a metal ion and an organic compound. The salt is capable of absorbing moisture and emits a

fluorescent signal when excited by light at the appropriate wavelength. The light is quenched as the coating complex absorbs moisture.

Wagner discloses a method for monitoring the glucose level in a body fluid. The method of Wagner utilizes an apparatus including a conjugate of glucose oxidase and a fluorescent dye coated onto an optical fiber. An excitation light source is used to trigger fluorescence emission which is registered by a fluorescence emission detector. The fluorescent dye detects oxygen quenching, as fluorescence emission increases in direct proportion to the glucose concentration in the fluid.

Bessman discloses a method and apparatus for detection of glucose in the body. The apparatus detects the absolute level of oxygen concentration in the fluid and corrects the output differential measurement indicative of the glucose level according to the absolute level of oxygen.

The independent claim (23) was rejected under Saaski alone. Saaski discloses a specific arrangement of an exciting fiber 40 and return fibers 46 with selected numeric apertures for maximizing the intensity of light coupled into the sensor fibers 76, 144, 206 and decoupling the fluorescent light out of the sensor fiber 76, 144, 206 or a fiber 152 into the return fibers 36. Further, Saaski requires that the different optical conductors be aligned toward one another, with their respective end faces positioned in a manner to avoid loss of light intensity of the exciting and fluorescent light with respect to the evanescent field principle. As discussed above, the arrangement of the end faces of the optical conductors for exciting light and fluorescent light, with respect to their numerical apertures, and the position/distance (function) of the fluorescing layer is essential for achieving localized measurable fluorescence intensity. In claim 23, the exciting light is directed directly into or in the direction of a fluorescing layer. This is different from what is show in Saaski and would not be obvious to one skilled in the art in view of the Saaski reference. Thus, it would not be obvious from Saaski for one skilled in the art to come to the present invention as defined in claim 23.

It is therefore submitted that the prior art references, either Saaski alone, or in conjunction with any of the remaining references, do not anticipate, nor render obvious, the present invention, as disclosed in independent claim 23.

Claims 24-44, which depend directly or indirectly from an allowable claim 23, are believed to be allowable based, at least, upon this dependence.

Should the Examiner wish to modify the application in any way, applicant's attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Please amend the paragraph beginning on line 10 of page 13 as follows:

Also represented in Figure 3 are temperature sensors 13 and heating elements 12 which project from the upper socket of the measuring head 1 in the form of a pin or in another suitable form, so that they can be positioned and fixed in a self-closed fashion in connection with correspondingly constructed holding bores in [the] supports [30] or bodies [40] (still to be described).

Please amend the paragraph beginning on line 18 of page 13 as follows:

The supports [30] or bodies [40] can be mounted on the otherwise planar surface of the socket by means of an optical cement.

Please amend the paragraph beginning on line 24 of page 13 as follows:

Figure 3b shows an example of a measuring head 1 on which, again, a support [30] or body [40] can be mounted. The single or a plurality of heating element(s) can be surrounded by a material 12.1 having good thermal conduction.

Please amend the paragraph beginning on line 13 of page 14 as follows:

The exciting light is now irradiated via optical fibres [3] into at least one of the two end faces of the limbs 30', 30'' into the transparent support 30, and the fluorescence is excited there in the layers 32 by multiple reflection. A portion of the fluorescent light is irradiated again onto the support 30 and, by reflection at the outer surfaces of the support 30, directed onto optical fibres [15, 16] for fluorescent light by the lower end faces of one or both limbs 30', 30'', and the intensity of the fluorescent light is detected by detectors [4] and, consequently, the material concentration can be measured as a consequence of fluorescence quenching.

Please amend the paragraph beginning on line 19 of page 17 as follows:

Figure 11 represents possible variants of the construction of end faces of the supports 30 or of the planar optical conductors [35] into which or from which the exciting light or the

fluorescent light can respectively be launched or coupled out, these end faces being correspondingly inclined in all these examples such that the reflection in the limbs 30', 30'' of the supports 30 can be optimized, on the one hand, for the excitation of the fluorescence and, on the other hand, for the alignment of the fluorescent light to be measured.

Please amend the paragraph beginning on line 30 of page 18 as follows:

Such a body 40, which can also be designated as a diffuser plate, can have cutouts or cavities 42 which are dimensioned and arranged such that the body 40 can be mounted on a measuring head 1 as represented, for example, in Figure 3. In this case, the exciting light is radiated into the body 40 by [the] an optical fibre [3] and distributed there diffusely, as a result of which a uniform excitation of fluorescence is achieved in the layers 32 and at least a portion of the fluorescent light is redirected onto the body 40, and directed from there into [the] optical fibres [16 and 15] onto the detectors [4] for the purpose of measuring the fluorescence intensity.

Please amend the paragraph beginning on line 33 of page 18 as follows:

It is also possible that the fluorescent light can be launched into [the] optical fibres [15, 16] from an end face of the layer(s) 32, and can thereby be directed onto the detector(s) [4, 5].

Please amend the paragraph beginning on line 25 of page 20 as follows:

A further example of a measuring head 1 according to the invention is represented in Figure 22, in two views. In this case, the exciting light of the light source 2 is launched only on one side into a limb [30' or 30''] of a support [30] such as is represented in Figures 4 to 15, and coupled out again from the respective other limb [30' or 30''] or both limbs [30' and 30''], and directed onto detectors 4 in order to determine the fluorescence intensity.

In the Claims:

23. (three times amended) Device for measuring fluorescence excited by light, which has at least one layer which is applied to a support and which at least one layer contains a fluorescing material, having at least one light source which emits light of at least one wavelength that excites fluorescence(s) and thus fluorescent light in the at least one layer, and which exciting light is directed through the support onto the at least one layer by at least one first optical conductor, the fluorescent light being directed by at least one second optical conductor onto at least one detector for determining the intensity of the fluorescent light, wherein the end faces of all the optical conductors are arranged relative to one another as a function of their numerical apertures and as a function [with reference to the position] of the at least one layer containing a fluorescing material and which layer is applied to the support, and the [at least one second optical conductor] optical conductors which are arranged as a bundle in the shape of a ring [are] with at least one first optical conductor, [arranged with the at least one optical conductor,] arranged in the interior of the ring, which optical conductors of the bundle [is] are used for exciting light or for [generating fluorescence] fluorescent light or [the at least one first optical conductor comprises] a plurality of [first] the optical conductors [and the at least one second optical conductor comprising a plurality of second optical conductors, and a plurality of the first optical conductors] are arranged in series arrangements opposite one another, with [ones] one of the first optical conductors and a corresponding [ones] one of the second optical conductors forming pairs such that it is possible to achieve a defined localized distribution of measurable fluorescence intensity, and the light source(s), the at least one first and at least one second conductors and the detector(s) are held in a measuring head.

26. (three times amended) Device according to claim 23, wherein at least one of a filter, a system of exchangeable filters or a launching optical system is arranged [in each case] between the light source and at least one first optical conductor.

28. (three times amended) Device according to claim 23, wherein the at least one second optical conductor for conducting exciting light, reference light or further fluorescent light comprises a plurality of second optical conductors which are arranged in an alternating fashion in an outer ring, and [at least one] a portion of the second optical conductors for conducting fluorescent light are arranged in an inner ring.

31. (three times amended) Device according to claim 23, wherein the support, which is transparent to exciting light and fluorescent light has a surface which contains partially polished

or reflecting surface regions or [the surface] is surrounded by a medium of lower refractive index, and is mounted in an exchangeable fashion on the measuring head.

35. (three times amended) Device according to claim 31, wherein, on an end face opposite an end face into which the exciting light can be launched, the support has an angular surface and a layer of the at least one layer which contains fluorescing material and at which the exciting and fluorescing light is reflected in the direction of a planar optical conductor constructed symmetrically relative to the support, and the light from the angular surface thereof is directed onto an end face arranged at the other end of an optical conductor, and from there at least fluorescent light is directed onto a detector via at least one of the optical [conductor] conductors, the support and planar optical conductor being arranged at a spacing from one another or being optically separated [as far as] into the region of the angular surface.

36. (three times amended) Device according to claim 31, wherein the support is of u-shaped construction comprising two limbs, the two limbs are optically separated from one another, and the exciting light can be launched into an end face of a limb via at least one additional optical conductor, and at least fluorescent light can be coupled out via the end face of the other limb into at least one further optical conductor, which at least one additional optical conductor and at least one further optical conductor are in addition to the at least one first and at least one second optical conductors.

39. (three times amended) Device according to claim 23, wherein between one of the optical conductors [for fluorescence-exciting light] and one of the at least one layers containing the fluorescing material, a transparent body made from optically scattering material is arranged or a body comprising a diffusely scattering surface is positioned facing the layer.